

## I. INTRODUCTION

- A. Purpose: To provide instruction on inspection and maintenance guidelines and procedures as well provide information on rope care, construction and safeguards.
- B. Scope: This instruction applies to all sworn personnel.
- C. Author: The Deputy Chief of the Special Operations Bureau shall be responsible for the content, revision, and period review of this instruction.
- D. Objectives: To assist Department members in identifying rope construction, inspection, care, and recordkeeping.
- E. Definitions: See glossary.

## II. RESPONSIBILITY

- A. All sworn personnel shall familiarize themselves with the information contained in this subject.
- B. Company officers/training captains are responsible for training personnel and ensuring proficiency with the information contained in this subject.

## III. POLICY

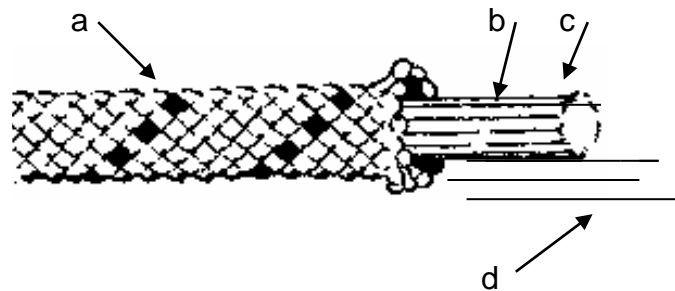
- A. Lifeline specifications:
  - 1. All new lifeline rescue rope in this Department is 12.5mm (1/2") PMI E-Z Bend™.
  - 2. Construction: Static Kernmantle
  - 3. Material: 100% Nylon
  - 4. Avg. Elongation: Less than 2% at 200 lbs load, 17% at 75% of minimum breaking strength, less than 20% at failure.
  - 5. Heat: Nylon type 6.6—Melts at 480-500 EF, becomes sticky at 445 EF, and yellows at 300 EF after five hours exposure.

6. Braid: One over and one under, for high abrasion resistance.
7. Core: Continuous, block creel construction, parallel nylon fiber bundles for low stretch and no spin.
8. Identification: Continuous marker in core bundle gives company name, place, and year of manufacture.

B. Kernmantle construction

1. Kernmantle design is a braided sheath woven over an inner core that is low stretch. The “kern” is the inner core of the rope and is made into bundles called yarns. The inner bundles contribute most of the rope’s tensile strength. They are continuous throughout the rope and run parallel, which not only reduces stretch, but also prevents spin.
2. This load carrying core (kern) is protected from dirt, abrasion, and cutting by a tightly braided outer sheath (mantle). The mantle contributes very little to the strength of the rope.

- a. Mantle or sheath
- b. Parallel yarn bundles
- c. Yarns
- d. Fibers



C. Lifeline rope strength (two-person rope)

1. All lifelines that meet the NFPA Standard 1983, 1995 edition must be at least 12.5 mm in diameter and have a minimum breaking strength of 9000 lbs.
2. The maximum working load for a two-person lifeline is 600 lbs. This calculates into a safety factor of 15 to 1. It is important to remember that this is only a component safety factor. It does not take into consideration the strength of the anchor system or other components in the rescue system as they relate to the load.

D. Lifeline care and safeguards

1. Lifelines shall be checked daily during the morning vehicle inspection, and thoroughly inspected after each use. This inspection shall be done as the lifeline is being reloaded into the rope bag. This inspection includes a visual check and feeling the rope as it is reloaded. The lifeline should be visually inspected for dirt, abrasion, broken strands, or other contaminants. The inspector should feel the lifeline for soft spots, sharp particles, lumps, depressions, and inconsistencies in the diameter of the lifeline, all of which could indicate probable damage to the core. If there is any doubt, the lifeline should be tagged at the suspected spot(s) and sent to the Department Rope Coordinator for evaluation.
2. Lifelines shall be inspected and inventoried monthly and noted on Form 248 (Rope System Inventory).
3. Do not step, stand, or walk on lifelines. This forces dirt and other sharp particles into the core and will cut the fibers within the core.
4. Lifelines shall be protected from abrasion and edges. Wherever needed, canvas edge pads, edge rollers, or other protective measures shall be used to protect lifelines from damage.
5. Lifelines shall be kept as clean as possible. Lifelines shall not be dragged through dirt or grime unless immediate life safety requires such action.
6. Lifelines shall be washed as needed. (See Volume 4, Chapter 6, Subject 4, page 4).
7. Lifelines shall be stored in the provided rope and equipment bags. These bags shall not be stored near fuel, battery, or high heat areas. All rope and equipment shall be stored inside an apparatus compartment.
8. Lifelines shall be used for training and rescue work only. They are not to be used for any other purpose.
9. Lifelines shall be removed from service and inspected by the Department Rope Coordinator if they have been subject to any of the following:

- a. Contact with acids and acid based material, alcohol, formaldehyde, or petroleum products. (Although, in most cases, petroleum products will not harm nylon, many petroleum products are mixed with other materials that may be harmful.)
- b. Tears, abrasions that expose the lifeline core, discoloration, stickiness (i.e., visible damage has occurred).
- c. Situations where the lifeline cannot be cleaned properly (excessive grease, pine tar)
- d. Temperatures in excess of 300° Fahrenheit (evident when the rope starts to yellow).
- e. Severe shock loading

10. Lifeline Rope Use Record (Form 247)

- a. After each use, whether training or actual rescue, an entry shall be made on the Form 247 assigned to the lifeline.

E. Prusik cord

- 1. The prusik cord used by our Department is Mammut™ 8 millimeter, nylon low-stretch kernmantle construction. It has a breaking strength of 3,375 lbs.
- 2. The care of the prusik cord is the same as the lifeline rope. A prusik cord should be checked closely, both during and after use, for wear. This is usually identified by a glazing on the prusik loop.

F. Equipment line (drop bag)

- 1. An equipment line is an assembly of 85 feet of braid over nylon 3/8-inch rope manufactured from Type 6-6 nylon, first quality commercial grade.
- 2. Both ends of an equipment line shall be eye-spliced around a type 316 stainless steel asymmetrical springless torsion gate with a tensile strength of 4,620 lbs.
- 3. The equipment line shall be kept in the provided drop bag, and attached to the harness of the breathing apparatus.

4. The equipment line shall be washed as needed with warm water and thoroughly dried before putting back into the drop bag.

Note: Equipment lines are NOT life-safety ropes and should never be used to support live loads.

G. Webbing

1. The webbing used by this Department is a 1-inch nylon with a spiral weave.
2. Mil-Spec type Mil-W-5625, with a breaking strength of 4,000 lbs.
3. The webbing is cut into lengths of 5 feet (green), 12 feet (blue) and 22 feet (red).
4. The rules of rope care and management apply to webbing. The webbing withstands abrasion well, but remains vulnerable to it. Webbing is not a kernmantle construction, so the outside surface, which is subject to abrasion's weakening effects, should be taken more seriously. If in doubt, throw it out.